

1 1. A primary alkaline AA battery, comprising:  
2 a housing;  
3 a cathode within the housing;  
4 an anode within the housing; and  
5 a separator electrically separating the anode and  
6 the cathode;  
7 wherein the battery has an  $(S/V)^2$  value of greater  
8 than 0.38.

1 2. The battery of claim 1, wherein the battery has  
2 an  $(S/V)^2$  value of greater than 0.42.

1 3. The battery of claim 1, wherein the battery has  
2 an  $(S/V)^2$  value of greater than 0.45.

1 4. A primary alkaline AAA battery, comprising:  
2 a housing;  
3 a cathode within the housing;  
4 an anode within the housing; and  
5 a separator electrically separating the anode and  
6 the cathode;  
7 wherein the battery has an  $(S/V)^2$  value of greater  
8 than 0.70.

1 5. The battery of claim 4, wherein the battery has  
2 an  $(S/V)^2$  value of greater than 0.75.

1 6. The battery of claim 4, wherein the battery has  
2 an  $(S/V)^2$  value of greater than 0.8.

1           7.    A primary alkaline AAAA battery, comprising:  
2           a housing;  
3           a cathode within the housing;  
4           an anode within the housing; and  
5           a separator electrically separating the anode and  
6   the cathode;  
7           wherein the battery has an  $(S/V)^2$  value of greater  
8   than 1.2.

1           8.    The battery of claim 7, wherein the battery has  
2   an  $(S/V)^2$  value of greater than 1.4.

1           9.    The battery of claim 7, wherein the battery has  
2   an  $(S/V)^2$  value of greater than 1.5.

1           10.   A primary alkaline C battery, comprising:  
2           a housing;  
3           a cathode within the housing;  
4           an anode within the housing; and  
5           a separator electrically separating the anode and  
6   the cathode;  
7           wherein the battery has an  $(S/V)^2$  value of greater  
8   than 0.110.

1           11.   The battery of claim 10, wherein the battery  
2   has an  $(S/V)^2$  value of greater than 0.120.

1           12.   The battery of claim 10, wherein the battery  
2   has an  $(S/V)^2$  value of greater than 0.125.

1 13. A primary alkaline D battery, comprising:  
2 a housing;  
3 a cathode within the housing;  
4 an anode within the housing; and  
5 a separator electrically separating the anode and  
6 the cathode;  
7 wherein the battery has an  $(S/V)^2$  value of greater  
8 than 0.065.

1 14. The battery of claim 13, wherein the battery  
2 has an  $(S/V)^2$  value of greater than 0.07.

1 15. The battery of claim 13, wherein the battery  
2 has an  $(S/V)^2$  value of greater than 0.075.

1 16. A primary alkaline AA battery, comprising:  
2 a housing;  
3 a cathode within the housing;  
4 a single cavity anode within the cathode; and  
5 a separator electrically separating the anode and  
6 the cathode;  
7 wherein the battery has an  $(S/V)^2$  value of greater  
8 than 0.15.

1 17. The battery of claim 16, wherein the battery  
2 has an  $(S/V)^2$  value of greater than 0.20.

1 18. The battery of claim 16, wherein the battery  
2 has an  $(S/V)^2$  value of greater than 0.30.

1 19. A primary alkaline AAA battery, comprising:  
2 a housing;  
3 a cathode within the housing;  
4 a single cavity anode within the cathode; and  
5 a separator electrically separating the anode and  
6 the cathode;  
7 wherein the battery has an  $(S/V)^2$  value of greater  
8 than 0.3.

1 20. The battery of claim 19, wherein the battery  
2 has an  $(S/V)^2$  value of greater than 0.4.

1 21. The battery of claim 19, wherein the battery  
2 has an  $(S/V)^2$  value of greater than 0.5.

1 22. A primary alkaline AAAA battery, comprising:  
2 a housing;  
3 a cathode within the housing;  
4 a single cavity anode within the cathode; and  
5 a separator electrically separating the anode and  
6 the cathode;  
7 wherein the battery has an  $(S/V)^2$  value of greater  
8 than 0.6.

1 23. The battery of claim 22, wherein the battery  
2 has an  $(S/V)^2$  value of greater than 0.8.

1 24. The battery of claim 22, wherein the battery  
2 has an  $(S/V)^2$  value of greater than 1.0.

1 25. A primary alkaline C battery, comprising:  
2 a housing;  
3 a cathode within the housing;  
4 a single cavity anode within the cathode; and  
5 a separator electrically separating the anode and  
6 the cathode;  
7 wherein the battery has an  $(S/V)^2$  value of greater  
8 than 0.06.

1 26. The battery of claim 25, wherein the battery  
2 has an  $(S/V)^2$  value of greater than 0.08.

1 27. The battery of claim 25, wherein the battery  
2 has an  $(S/V)^2$  value of greater than 0.10.

1 28. A primary alkaline D battery, comprising:  
2 a housing;  
3 a cathode within the housing;  
4 a single cavity anode within the cathode; and  
5 a separator electrically separating the anode and  
6 the cathode;  
7 wherein the battery has an  $(S/V)^2$  value of greater  
8 than 0.03.

1 29. The battery of claim 28, wherein the battery  
2 has an  $(S/V)^2$  value of greater than 0.04.

1 30. The battery of claim 28, wherein the battery  
2 has an  $(S/V)^2$  value of greater than 0.05.

1           31. The battery of claim 1, 4, 7, 10, 13, 16, 19,  
2 22, 25, or 28 wherein the cathode comprises manganese  
3 dioxide.

1           32. The battery of claim 1, 4, 7, 10, 13, 16, 19,  
2 22, 25, or 28 wherein the anode comprises zinc.

1           33. The battery of claim 1, 4, 7, 10, 13, 16, 19,  
2 22, 25, or 28 wherein the cathode comprises manganese  
3 dioxide and the anode comprises zinc.

1           34. The battery of claim 1, 4, 7, 10, 13, 16, 19,  
2 22, 25, or 28, wherein the anode comprises a lobed cavity  
3 within the cathode.

1           35. The battery of claim 34, wherein the anode  
2 includes only two lobes.

1           36. The battery of claim 34, wherein the anode  
2 includes three lobes.

1           37. The battery of 34, wherein the anode includes  
2 four lobes.

1           38. The battery of claim 34, wherein the anode  
2 includes fives lobes.

1           39. The battery of claim 34, wherein the anode  
2 includes nine lobes.

1           40. The battery of claims 1, 4, 7, 10, 13, 16, 19,  
2 22, 25, or 28, wherein the anode includes multiple cavities  
3 within the cathode.

1           41. The battery of claim 40, wherein the multiple  
2 cavities comprise two D-shaped cavities.

1           42. The battery of claim 41, wherein the anode  
2 further includes a connection between the two D-shaped  
3 cavities.

1           43. The battery of claim 41, wherein the anode does  
2 not include a connection between the D-shaped cavities.

1           44. The battery of claim 40, wherein the cavities  
2 include two pie-shaped cavities.

1           45. The battery of claim 44, wherein the cavities  
2 include three pie-shaped cavities.

1           46. The battery of claim 45, wherein the cavities  
2 include four pie-shaped cavities.

1           47. A battery comprising:  
2 a housing;  
3 a first electrode within the housing;  
4 a second electrode within the first electrode, the  
5 second electrode including nine lobes; and  
6 a separator between the first electrode and the  
7 second electrode.

1 48. The battery of claim 47, wherein the housing is  
2 cylindrical.

1 49. The battery of claim 47, wherein the second  
2 electrode is an anode comprising zinc.

1 50. The battery of claim 47 or 49 wherein the first  
2 electrode is a cathode comprising manganese dioxide.

1 *AB* 51. A battery comprising:  
2 *AB* a housing;  
3 a first electrode within the housing;  
4 a second electrode within the first electrode, the  
5 second electrode consisting essentially of a single cavity;  
6 and  
7 a separator between the first electrode and the  
8 second cavity;  
9 wherein the battery has a  $(S/V)^2$  cathode OD v. cell  
10 diameter value at least 0.01 above Plot A.

1 52. The battery of claim 51, wherein the battery  
2 has a  $(S/V)^2$  cathode OD v. cell diameter value at least 0.02  
3 above Plot A.

1 53. A battery comprising:  
2 a housing;  
3 a first electrode within the housing;  
4 a second electrode within the first electrode; and  
5 a separator between the first electrode and the  
6 second cavity;  
7 wherein the battery has a  $(S/V)^2$  cathode OD v. cell  
8 diameter value at least 0.01 above Plot B.



1 54. The battery of claim 53, wherein the battery  
2 has a  $(S/V)^2$  cathode OD v. cell diameter value at least 0.01  
3 above Plot A.